

FIGURE 1

VAP-1 amino acid sequence (SEQ ID NO:1)

MAVLAVVLLACLERA VAQTFGCSNTKINDQARKMFYDAHNDARRSMAKGLE
PNKCGLLSGGKNVYELNWDCEMEAKAQEWADGCPSSFQTFDPTWGQNYATYM
GSIADPLPYASMAVNGWWSEIRTVGLTDPDNKYTNSAMFRFANMANGKASAFG
CAYALCAGKLSINCIYNKIGYMTNIIYEKGDAC TSDAECTTYSDSQCKNGLCYK
APQAPVVETFTMCPSVTDQSDQARQNFLDTHNKLRTSLAKGLEADGIAAGAFAP
MAKQMPKLVKYSCTVEANARTWAKGCLYQHSTSAQRPG LGENLYMISINNMP
KIQTAE DSSKAWWSELKDFVGSDNILTQAVFDRGVGHY TQMAWEGTTEIGCF
VENCPTFTYSVCQYGPAGNYMNQLIYTKGSPCTADADCPGTQTCSVAEALCVIP

vap-1 cDNA nucleotide sequence (SEQ ID NO:2)

ATGGCGGTATTAGCAGTGGTACTACTTCTAGCATGCCTGGAGAGAGCGGTTG
CACAGACGTTCCGCTGCTCTAACACCAAGATCAATGACCAGGCTCGTAAGAT
GTTCTATGATGCTCACAATGATGCAAGACGAAGCATGGCTAAAGGGCTTGAG
CCAAACAAGTGCGGACTCTTATCTGGTGGAAAGAATGTTTATGAATTGAATT
GGGATTGCGAGATGGAAGCAAAAGCTCAGGAATGGGCAGACGGATGTCCCA
GCTCTTCCAGACATTTGATCCAACATGGGGGCAGAACTACGCGACGTACAT
GGGATCGATTGCTGATCCGCTTCCATACGCTTCCATGGCTGTTAATGGGTGGT
GGTCGGAAATTAGAACCGTAGGACTTACGGATCCTGATAACAAGTACACTAA
CAGTGCAATGTTCCGATTTGCTAATATGGCAAATGGTAAAGCTTCAGCTTTG
GATGTGCATACGCGTTGTGCGCAGGAAAACTATCCATCAATTGCATTTACAA
CAAGATAGGATACATGACCAATGCTATCATTTATGAAAAAGGAGATGCCTGT
ACCAGTGACGCTGAATGCACCACCTACTCAGACTCACAATGCAAAAACGGTC
TTTGCTATAAGGCACCTCAAGCTCCAGTCGTTGAGACTTTCACAATGTGCCCT
TCGGTCACGGACCAGTCGGATCAGGCGCGTCAAAACTTCTTGGACACCCATA
ACAAATTGCGTACAAGCCTTGCCAAGGGACTTGAAGCTGATGGAATTGCCGC
TGGAGCATTGACCAATGGCCAAGCAAATGCCAAAAC TGGTAAAATACAGC
TGCACAGTTGAAGCAAACGCCAGAACATGGGCAA AAGGATGCCTTTACCAGC
ATTCAACAAGCGCACAGAGACCAGGACTCGGTGAAAATCTTTATATGATCAG
CATTAACAACATGCCTAAAATTCAAACCGCGGAGGACTCCTCAAAGGCTTGG
TGGTCCGAGTTGAAAGACTTCGGAGTCGGTTCTGACAACATTCTGACCCAAG
CAGTTTTTGATCGTGGCGTTGGACATTACACAAAATGGCATTGGGAAGGAAC
TACTGAAATTGGATGTTTTGTGGAGAATTGTCCAACATCTACTTATCCGTAT
GCCAATATGGTCCAGCGGGAAACTACATGAACCAACTAATCTATACCAAGGG
CTCACCATGCACAGCTGACGCCGATTGCCAGGAACCCAGACATGCAGTGTC
GCTGAAGCATTATGTGTTATCCCTTAGTAAATTTTCTATGCAACTCTTTGAAA
GTCATAATAAATATGCAAAAATTAAAAAAAAAAAAA

FIGURE 1, cont.

VAP-2 amino acid sequence (SEQ ID NO:3)

MNVVLSAVTLFLIFRYAQTVNIEGSGGNDELLEQNVWNDVDDKVVEALGGLDD
ELLTEHVCNKSTITQLQQEIIILTHNELRRSLAFGKQRNKRGLMNGARNMYKLD
WDCELASLAANWSTSCPQHFMPSVLGSNAQLFKRFYFYFDGHDSTVHMRNA
MKYWVWQQGEEKGNEDQKNRFYARRNYFGWANMAKGTKYRVGCSYIMCGDG
ESALFTCLYNEKAQCEKEMIYENGKPCCEDKDCFTYPSKCLVPEGLCQAPSMV
KDDGGSFQCDNSLVSDVTRNFTLEQHNFYRSRLAKGFEWNGETNTSQPKASQM
IKMEYDCMLERFAQNWANNVCVFAHSAHYERPNOGQNL YMSSFSNPDRSLIHT
AVEKWWQELEEFGTPIDNVLTPELWDLKGKAIGHYTQMAWDRTYRLGCGIANC
PKMSYVVCHYGPAGNRKNNKIYEIGDPCEVDDDCPIGTDCEKTTSLCVISK

vap-2 cDNA nucleotide sequence (SEQ ID NO:4)

ATGAACGTGGTCCTTTCCGCTGTCACTCTTTTTCTTATTTTTTCGATATGCGCAG
ACTGTGAATATAGAAGGCAGTGGAGGAAATGATGAGCTTCTTGAGCAGAACG
TGTGGAACGATGTAGACGACAAGTTGTAGAAGCACTTGGTGGTCTTGATGA
TGAACGTCTAACCGAACATGTGTGTAACAAATCAACGATCACTCAGCTACAG
CAGGAGATCATCTTGACAACCCACAATGAATTACGAAGATCATTGGCTTTTCG
GAAAGCAAAGAAACAAGAGAGGTCTCATGAACGGTGCAGAGAAATATGTATA
AACTGGATTGGGATTGTGAAGTGGCATCACTTGCAGCCAATTGGTCAACCTCC
TGCCCTCAGCACTTATGCCGCAATCGGTACTTGGCTCCAACGCTCAGCTTTT
TAAGCGTTTCTATTTTTATTTTGATGGGCACGACTCTACTGTACATATGCGAA
ACGCGATGAAGTATTGGTGGCAGCAAGGTGAAGAAAAAGGCAATGAGGATC
AGAAAAATAGATTCTATGCCAGACGAAATTATTTGGATGGGCAACATGGC
AAAAGGAAAAACATATCGAGTTGGATGCTCGTATATTATGTGCGGCGACGGT
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AAATGATTTACGAAAATGAAAAACCTGCTGTGAGGATAAAGACTGTTTCAC
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TGTCACCCGCAATTTCACTTTGGAGCAACACAATTTTATAGATCTCGTCTTG
CAAAAGGTTTTGAATGGAATGGAGAAACAAACACTTCCCAGCCAAAGGCTAG
TCAAATGATCAAAATGGAGTATGACTGCATGTTGGAACGGTTTGCACAAAAAC
TGGGCAAATAATTGCGTTTTTGCACACTCGGCACATTACGAAAGACCGAATC
AGGGTCAGAATCTCTACATGAGTTCTTTCTCAAACCTGATCCTAGAAGCCTT
ATACATACGGCCGTCGAGAAGTGGTGGCAGGAATTGGAGGAGTTCGGTACTC
CAATTGATAACGTTCTGACACCCGAATTGTGGGATTTGAAAGGGAAAGCGAT
AGGACATTACACTCAGATGGCCTGGGATCGTACTTACCGTCTTGGTTGTGGAA
TCGCAAACTGTCCGAAGATGTCTGACGTGGTTTGTCACTATGGGCCAGCAGG
CAACAGAAAGAACAATAAAATCTATGAAATCGGGGATCCTTGCGAAGTCGAT
GATGATTGCCCGATTGGAACAGATTGTGAAAAGACAACCTCTTTATGTGTGAT
CTCAAAATAA

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FIGURE 2: Schematic diagram of nematode venom allergen protein domains

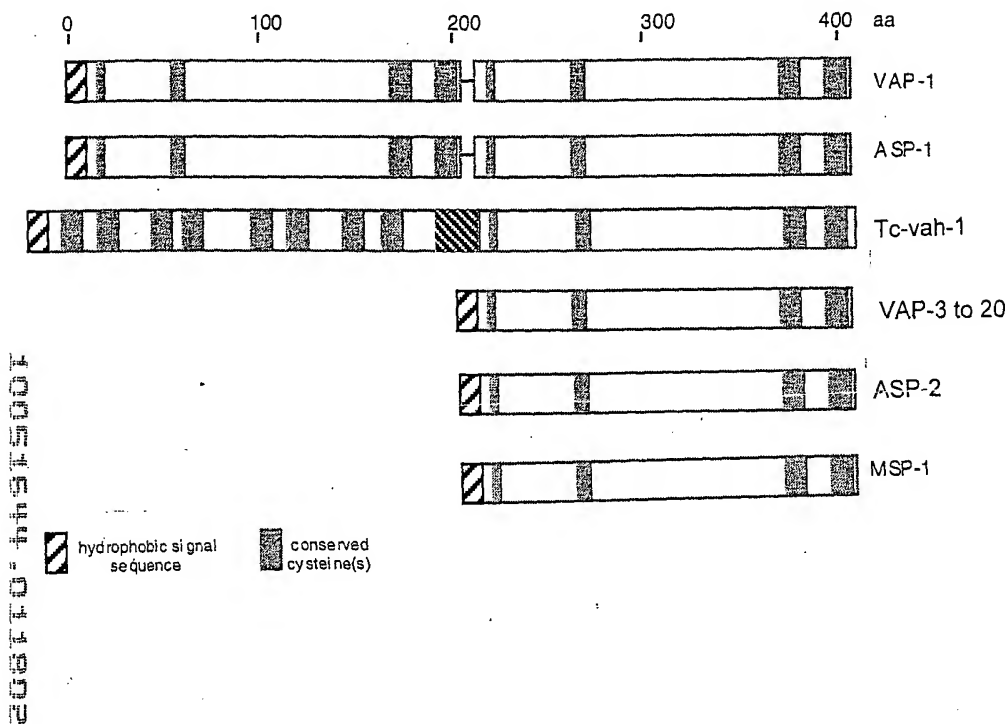


FIGURE 3

CLUSTAL W Alignment of VAP-1, VAP-2, and selected other nematode VA proteins.

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VAP-1 N 1 .....MAVLAVVLLLA CLERAVAQTFG 22
VAP-1 C 1 .....PQAPVVETFTM 11
VAP-2 N 1 MNVVL SAVTLFLIFRYAQTVNIEGSGGNDELLEQNVWNDVDDKVVEALGGLDDELLTEHV 60
VAP-2 C 1 .....SFQ 3
ASP-1 N 1 .....MFSPVIVSVIFTIAFCDASPARDGGF 26
ASP-1 C 1 .....DVPETNQ 8
VAP-3 1 .....MNYLLLVALAVG 13
MSP-1 1 .....MSNKLIISILILTI 14

VAP-1 N 23 CSNTKIN--DQARKMFYDAHNDARRSMAKGLEPN--KCGLLSGGKNVYELN-WDCMEEA 76
VAP-1 C 12 CPSVT-DQSDQARQNF LDT HNKLRTSLAKGLEADGIAAGAFAPMAKQMPKLVKYSCTVEA 70
VAP-2 N 61 CNKST--ITQLQQEII LTT HNELRRSLAFGKQRN--KRG LMGARNMYKLD-WDCLELAS 114
VAP-2 C 4 CDNSLV--SDVTRNF LLEQHNFYRSLAKGF EWNG-ETNTSQPKASQMIKME-YDCMLER 59
ASP-1 N 27 CSNSG--ITDKDRQAF LDFHNNARRRVAKGV EDS--NSGKLNPAKNMYKLS-WDCAMEQ 80
ASP-1 C 9 CPSNT-GMTDSVRDTFLSVHNEFRSSSVARGLEPD--ALGGNAPKAAKMLKMOV-YDCVEEA 64
VAP-3 14 CSADFG--SSGQNGIINAHNTLRSKIAKGTYYA--KGTQKSPGTNLLKMK-WDSAVAA 66
MSP-1 15 YTYVNSLTVPEQNAVVDCTNKKYASQLANQTKN--KNGGNFFSGKDI LEVS-YSKDL EK 77

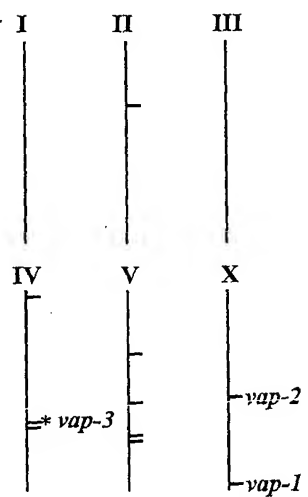
VAP-1 N 77 KAEWADGCPSSSFQT--FDPT--WGQNYATYMGSI--ADPLPYASMAVNGWWS EIRTYG 129
VAP-1 C 71 NARTWAKGCLYQHSTSAQRPG--LGENLYMISINN--MKIQTAEDSSKAWWS ELKDFG 125
VAP-2 N 115 LAANWSTSC PQHFMPQSVLGS--NAQLFKRFYFYFDGHDSTVHMRNNA MKYWWQ QGEEKG 171
VAP-2 C 60 FAQNWANNCFVFAHSAHYERP N--QGNLYMSSFSN--PDPRS LIHTA VEKWWQ ELEEFG 114
ASP-1 N 81 OLQDAIQSCP SAFAEAG--IQG--VAQNMVSWSSSGGF PDPSPSKI EQLTSGWWS GAKKNG 134
ASP-1 C 65 SAIRHGKNCVYQHS HGEDRPQ--LGENLYKTSVLK--FDKKNKA AKQASQLWNN ELKEFG 119
VAP-3 67 SAQNYANGCPTGHSG--DAG--LGENLYWYWTSGSLGDLNQYGSAAJASASWEKE FQDYG 120
MSP-1 72 SAQRWANKCIFDHNGTDLYSGGKFG ENLYLDGDFEH-KNITQLMIDACNAWWE ESTTDG 130

VAP-1 N 130 LTD--PDNK--YTNSA--MFRFANMANGKASAFGCAYALCAGKL--SINCI 172
VAP-1 C 126 VGS D--N ILTQA--VDRG--VGHYTQMAWEGTTEIGCFVENCPTFT--YSV CQ 171
VAP-2 N 172 NEDQ--KNR--FYARRN--YFGWANMAK GKTYR VGC SYIMC GDGES--ALFTCL 217
VAP-2 C 115 TPID--NVLTP E--LWDLKGKAI GHYTQMAWDR TYRLGCGIANCPKMS--YVVC H 163
ASP-1 N 135 VGPD--N--KYNGGG--LFAFSNMVYS EITTKLGCA YKVC GTKL--AVSCI 176
ASP-1 C 120 VGPS--NVLTTA--LWNRPGMQIGHYTQMAWDTTYKLGCAVVF CNDFT--FGVCQ 168
VAP-3 121 WKS--NLMTID--LFNTG--IGHATQMAWAKSNLIGCGVKDCGRDSNGLNKVTVVCQ 171
MSP-1 131 VPPSWINNFLPTDNKENDEKFEAVGHWTQMAWAKTYQIGCALKVCHHKPDCNGN--LIDC R 188

VAP-1 N 173 YNKIGYMTNAI IYEKGDACTSDAEC TTSY--DSQCKNGLCYKA--213
VAP-1 C 172 YGPAQNYMMLIYTKGSPCTADADCPGTQ--TCSVAEALC-V--IP--212
VAP-2 N 216 YNEKAQCEKEMIYENGKPCCEDEKDCFTYFGSKCLVPEGLCQAPSMVKDDGG 258
VAP-2 C 164 YGPAQGNRKNKNIYEIQPCVEDDDCFTGT--DCEKTTSLC-V--ISK--205
ASP-1 N 177 YNGVGYITNQPMWETQACCKTGADCSYK--NSGCE DGLCTKGP--218
ASP-1 C 169 YGPGGNYMGHVIYTMGATPCS--QCSPQAL--TCSVTEGLC-S-A--P--206
VAP-3 172 YKPQGNFINQYIYVSGATCS--GCPSGT--SCETS TGLC-V--207
MSP-1 189 YYPGGNGMGSP IYQQGK PAS--GCGKAG--PSTKYSGLCKPDPHQNN--231

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FIGURE 4: Schematic map of selected *C. elegans* *vap* genes



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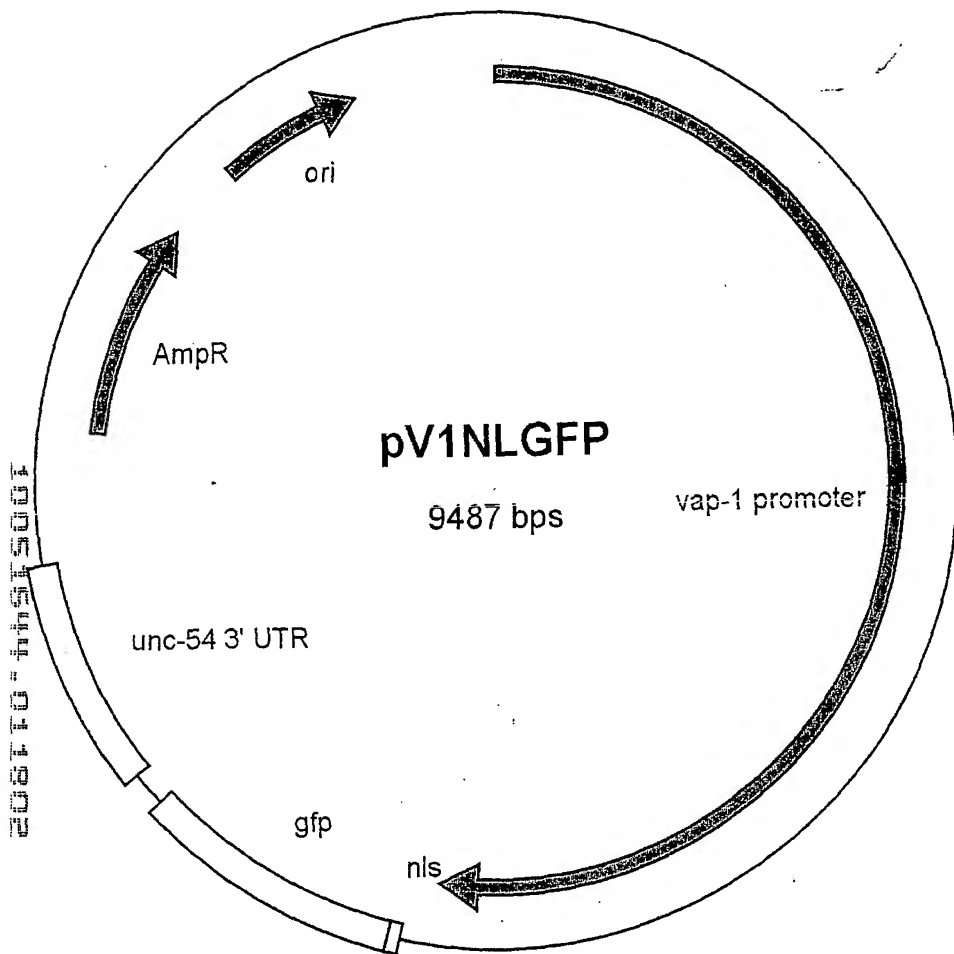


FIGURE 5A

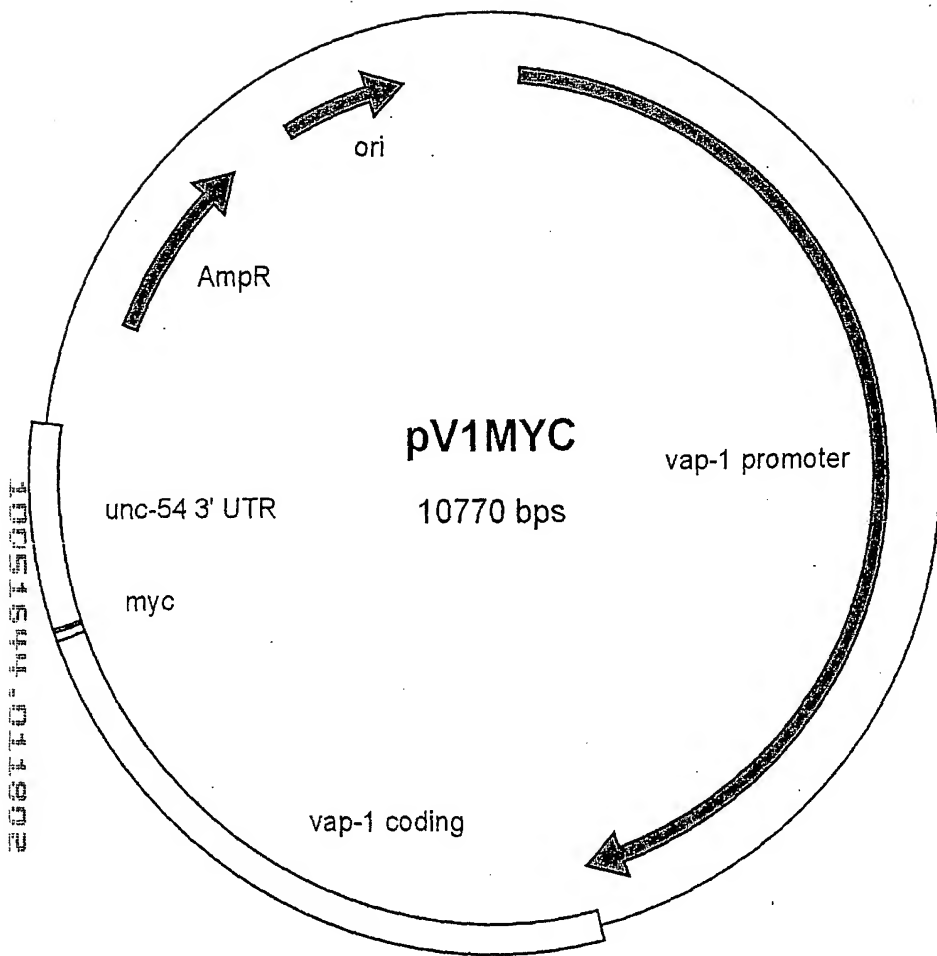


FIGURE 5B

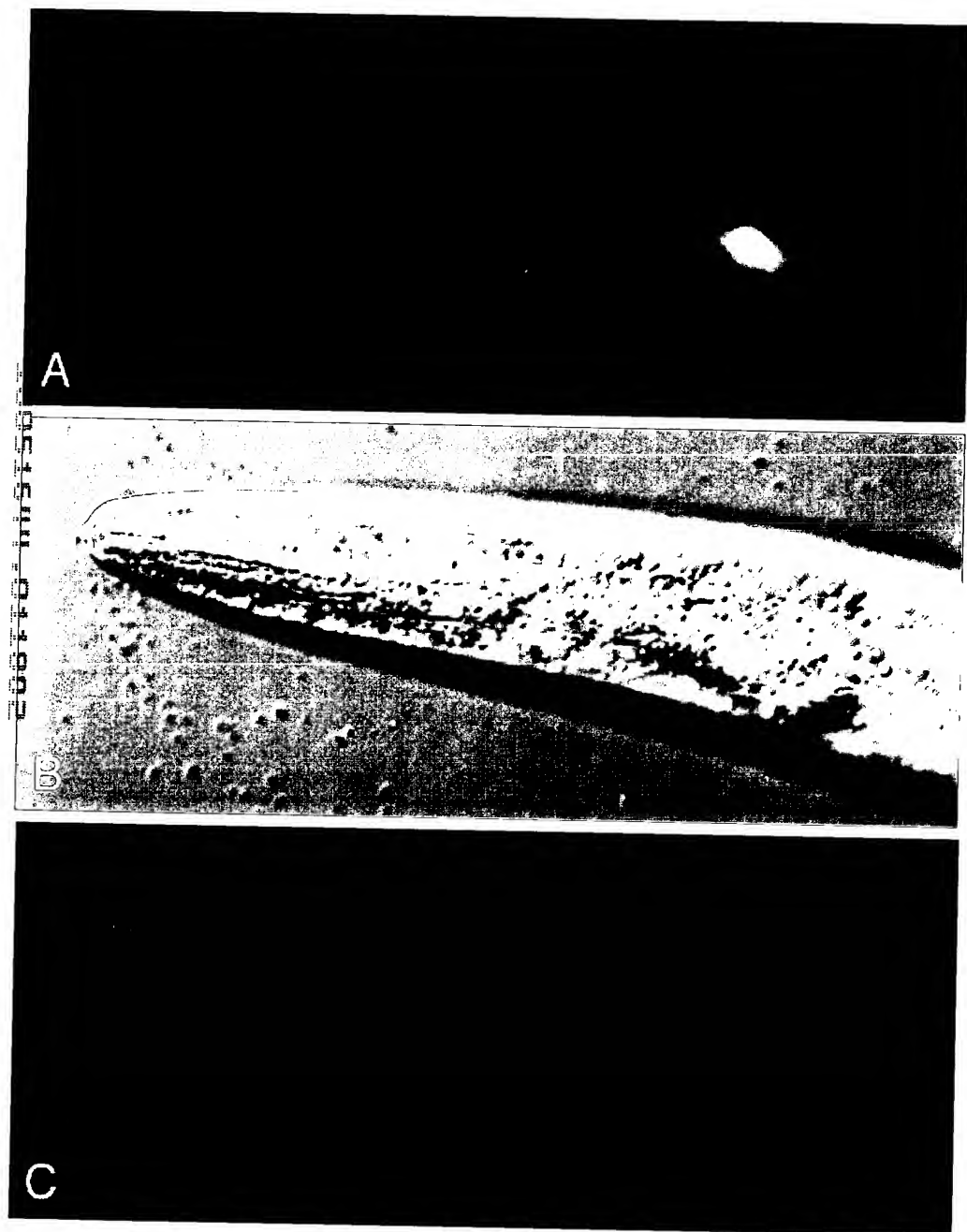


FIGURE 6

FIGURE 7

1

2

3

97 —
66 —
45 —
30 —

208F10-11h9T500T

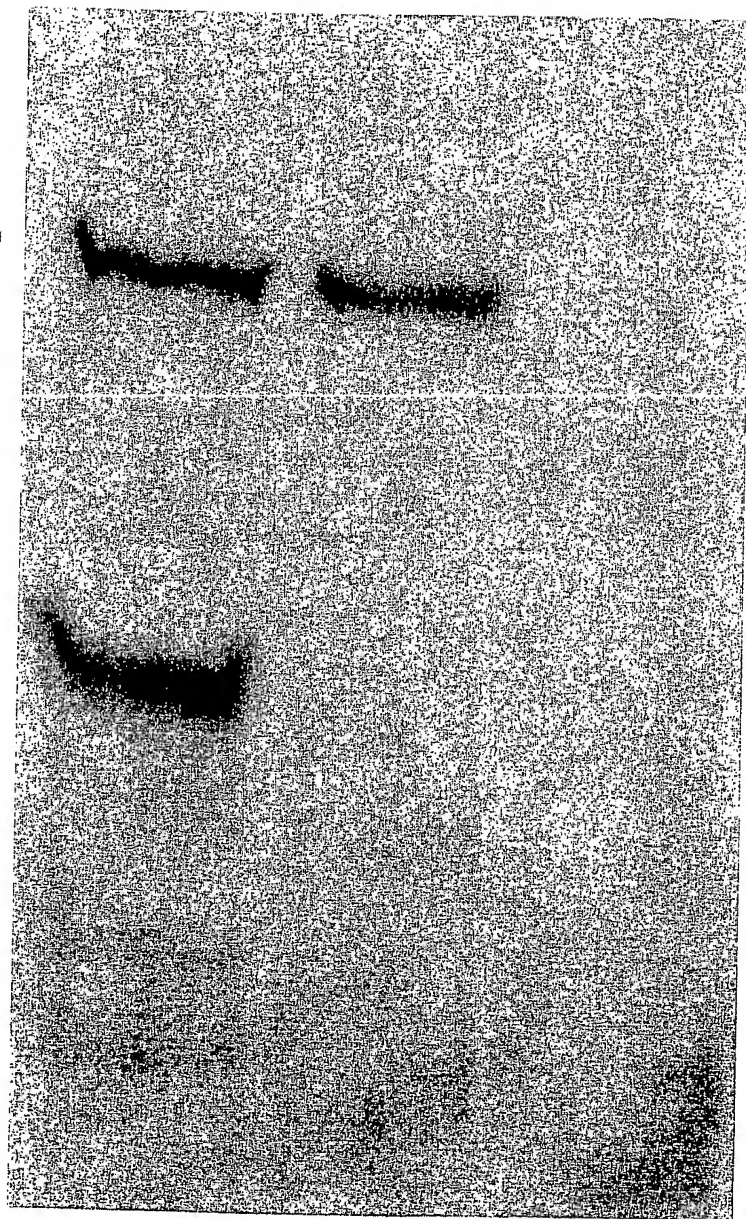
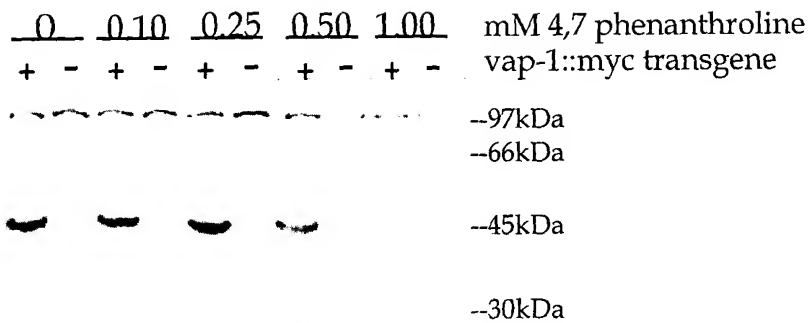


FIGURE 8



200T10-449T500T